ISOLATED AREAS

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Isolated Areas

- Isolated areas are becoming more commonplace
- Occur on Transport & Executive Aircraft
  - Purser Workstations
  - Crew Rest Areas
  - Private Bedrooms / Offices

Private Bedrooms and Offices

- We Will Focus on Three Aspects
  - Emergency Floor Proximity Lighting
  - Supplemental Oxygen
  - Smoke Detection

Floor Proximity Lights

- The requirement for a Floor Proximity Emergency Escape Path Lighting System (FPEEPMS) was implemented by § 25.812(e), Amendment 25-58
- Section 121.310(c)(3) requires a FPEEPMS for all transport aircraft certificated after January 1, 1958
- Part 25 requirements are applicable to both transport and executive aircraft

Floor Proximity Lights

- Regulation:
  - § 25.812(e) - Floor proximity emergency escape path marking must provide emergency evacuation guidance for passengers when all sources of illumination more than 4 feet above the cabin aisle floor are totally obscured. In the dark of the night, the floor proximity emergency escape path marking must enable each passenger to--
    - After leaving the passenger seat, visually identify the emergency escape path along the cabin aisle floor to the first exits or pair of exits forward and aft of the seat; and
    - Readily identify each exit from the emergency escape path by reference only to markings and visual features not more than 4 feet above the cabin floor.

Floor Proximity Lights

- Guidance Material
  - AC 25.812-1A
    - Powered systems
    - Incandescent
    - Electroluminescent
  - AC 25.812-2
    - Photoluminescent
  - Rules / guidance material were written around passenger configurations
    - Typified by rows of seats installed adjacent to the main aisle

Floor Proximity Lights

- Executive Interior Considerations
  - FPEEPMS must provide guidance to passengers located throughout the cabin interior
  - Isolated areas that can be occupied for TT&L must be evaluated
    - Passengers must be able to find their way to the main aisle using the FPEEPMS

Floor Proximity Lights

- Use of Floodlights (Exit Identifiers)
  - Floodlights have been used to guide passengers from an isolated area to the main aisle
    - Floodlights located near the doorway of the isolated area
  - Caution
    - Floodlights in the main cabin may provide a lot of light, but may not provide the guidance as a series of incandescent lights

Floor Proximity Lights

- Summary:
  - Design of a FPEEPMS system for executive interiors can be challenging, and somewhat controversial
  - Naïve subject tests may be required to validate the efficacy of the FPEEPMS
  - Close coordination with the project ACO is essential!

Supplemental Oxygen

- Regulation
  - § 25.1447
- Guidance
  - AC 25-17
- AC 25-17 addresses executive interiors, groupings of persons
  - Need to minimize the likelihood that a person will take the mask intended for another

Supplemental Oxygen

- Isolated Areas Considerations
  - Occupants must be aware that there is a need for supplemental oxygen
    - Automatic presentation of masks provides indication
    - Automatic presentation is ineffective if you can't see the masks drop
    - Transport configurations are somewhat reliant on crowd awareness; not necessarily provided in isolated areas

Supplemental Oxygen

- Mask Drop Awareness
  - Translating / swiveling seats require additional oxygen system design considerations
  - Occupants may not see masks drop because of seat orientation
  - Additional notification may be necessary
    - Aural
    - Visual

Supplemental Oxygen

- Accessibility
  - Oxygen must be accessible when occupants are seated and belted
  - Masks shouldn't be able to be donned without initiating oxygen flow
  - Design needs to consider couches transformed into beds, seats with very large recline, etc., and the accessibility / donning criteria

Smoke Detection

- Private bedrooms, offices and other areas in an executive interior are likely to be isolated by a door preventing early detection of a fire.
- If not immediately combated, a fire in such an isolated area could ultimately result in the loss of the aircraft.

Smoke Detection

- Pertinent Regulations
  - § 25.854 (Lavatory fire detection)
  - § 25.858 (Cargo or baggage compartment smoke or fire detection systems)
- Regulations don't completely address executive interior configurations

Smoke Detection

- Are smoke detectors required for isolated compartments?
  - YES! They are a requirement on transport AND executive interiors
    - Special conditions (747 crew rests)
    - Equivalent safety findings (777 lower lobe)
    - Methods of compliance (737-BBJ)

Smoke Detection

- Design Requirements for Smoke Detectors
  - Visual indication in the flight deck
  - Aural warning within the isolated compartment
  - Detection within one minute after the start of a fire, and at a temperature significantly below the point of structural degradation
  - Doesn't have to be a cargo compartment detection system

Smoke Detection

- Smoke detectors in isolated areas make good sense!
  - Include them in your certification plans

Handholds

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Handholds

- Firm handholds are a requirement of Part 25
  - Regulation in effect at the adoption of Part 25 {§ 25.785(d)}
    - If the seat backs do not have a firm hand hold, there must be a hand grip or rail along each aisle to enable occupants to steady themselves while using the aisles in moderately rough air.
  - Regulation {25.785(j)} is essentially unchanged at Amendment 25-88

Handholds

- Requirements apply to:
  - Transport Aircraft (i.e., airline revenue service)
    - – Seats throughout the passenger cabin
  - Executive Aircraft (i.e., business jets)
    - – No typical cabin configuration

Handholds

- FAA Guidance
  - – Reference AC 25-17
- Seat backs may serve as a firm hand hold
  - – Many seats are capable of breakover
  - – Breakover load must be adequate to be considered firm - minimum of 25 pounds resistance when applied at the top of the seatback

Handholds

- Must be evaluated for both "expected" and "unexpected" turbulence
  - For unexpected turbulence, the distance between the handholds and the relative position of the handholds is crucial.

Handholds

- Armrests aren’t adequate
  - Too low - typically around 24 inches off the ground
  - Acceptable height is 33 inches or more
- Stowage bins aren’t adequate (typically)
  - Smooth surfaces - nothing to grasp
  - Too high
  - Could be considered with an integrated rail

Handholds

- Additional Considerations
  - Large seat pitches (up to 65 inches)
    - Large amounts of recline are typical
    - Seatbacks may still be used as handholds
    - Seatbacks become ineffective handholds when they are reclined below 33 inches above the floor

Handholds

- If the seatbacks are ineffective due to distance and/or height, supplementary features must be added!

Handholds

- Additional Considerations
  - Very Large Pitch / Very Large Recline
    - Maximum spacing between handholds should not be greater than 65 inches
    - Supplementary features should be readily obvious and must be effective
      - » Additional bars / rails installed on seats have been accepted
      - » Knobs / posts installed on seats have not been accepted
      - » Handrails

Handholds

- Executive Interiors
  - Handholds need to be evaluated throughout the passenger cabin
    - Supplementary features may be necessary due to distances between seats / other handholds
    - Long narrow corridors
      - May be acceptable provided there are means for the passengers to steady themselves
  - Close coordination with the project ACO is essential!